

**REMARKS:**

Claims 1-8 are in the case and presented for consideration.

Claim 1 has been amended only to correct a typographical error so that no new issued have been raised that would require any further consideration or search. Entry of this amendment at least for appeal purposes, is therefore respectfully requested.

The Examiner has rejected claims 1, 2 and 4-8 as being obvious and unpatentable over U.S. Patent 5,340,621 to Matsumoto, et al. in view of U.S. Patent 5,753,045 to Karner, et al. Claim 3 is rejected as being obvious from this combination, taken further in view of U.S. Patent 6,015,597 to David. The Examiner's reasons for the rejection are set forth on pages 2-4 of the January 4, 2006 Office Action.

Applicants respectfully traverse this rejection.

The Examiner stated specifically that Matsumoto, et al. teach "two plasma discharge configurations that form two plasma beams 7..." See page 2 of the January 4, 2006 Office Action. In response, Applicants respectfully traverse the above ground of rejection. Matsumoto, et al., as read by Applicants, teach a plasma discharge configuration that produces "a thin plane shaped, sheet like plasma." See, e.g., Matsumoto, et al., col. 6, lines 9-11. The sheet plasma spreads out in a plane parallel to the substrate (see, e.g., Matsumoto, et al., col. 6, lines 9-11), and covers practically the entire substrate surface (see, e.g., Matsumoto, et al., Fig. 4).

In contrast, the plasma employed in the present invention is formed about, and extends longitudinally along, at least two substantially parallel beam axes (A), and is sufficiently defined, contrary to the Examiner's assertion, by the plasma discharge

configuration that generates the plasma. See, e.g., claim 1. Applicants have referred to this form of plasma as a plasma beam, which Applicants are entitled to do under MPEP § 2111.01(III) (stating that “[a]n applicant is entitled to be his or her own lexicographer...”). Also, unlike the sheet plasma of Matsumoto, et al., the width of the plasma beam along the beam axis does not cover the entire substrate surface. It is thus apparent to one of ordinary skill in the art appraised of Matsumoto, et al. and the present application that the plasma discharge configuration recited, for example, in claim 1 produces a plasma that has an entirely different geometry than the “sheet like plasma” of Matsumoto, et al. A claim is obvious only if the applied references teach or suggest all the claim limitations. Since, Matsumoto, et al. do not teach the plasma discharge configuration and the plasma beam as recited, e.g., in claim 1, the proposed combination cannot render the claimed invention obvious. Reconsideration and withdrawal of this ground of rejection is, therefore, respectfully requested.

The Examiner further stated: “motivation for replacing the gas supply configuration of Matsumoto, et al. with the gas supply configuration of Karner, et al. is to provide a more effective means of supplying the reactant gas, which increases the dwell time of the gas in the plasma, and more uniformly coat the deposit configurations.” See page 3 of the January 4, 2006 Office Action. In response, Applicants respectfully traverse the above ground of rejection.

Matsumoto, et al. placed the sheet plasma between the substrate and the reactive gas supply so that the reactive gas molecules are excited by their collision with electrons or ions in the plasma as they ***pass through the sheet plasma***. See, e.g., Matsumoto, et

al., col. 2, lines 42-48.

Karner, et al. is primarily concerned with improving homogeneous treatment of large substrate surfaces. See, e.g., Karner, et al., col. 1, lines 62-65. According to Karner, et al., the workpieces undergoing surface treatment are arranged around a cylindrical plasma beam, along a rotational surface. See, Karner, et al., col. 2, lines 4-8, and Fig. 1. The purpose of this arrangement is to take advantage of the **rotational symmetry of the plasma beam discharge** (see, e.g., Karner, et al., col. 3, lines 53-61) and to **minimize plasma density fluctuations** (see, e.g., Karner, et al., col. 3, lines 43-51). While the Karner, et al. reference may possibly teach arranging substrates around areas of low plasma density (instead of around areas of high plasma density, as taught by U.S. Patent 5,616,373 to Karner, et al. and U.S. Patent 4,749,587 to Bergmann, et al.) to reduce plasma density fluctuations, it does not contain any language or show any appreciation that would lead a person skilled in the art to the conclusion that parallel gas flow (with respect to the discharge axis) is advantageous over perpendicular gas flow in all PECVD systems.

Due to the orientation of the plasma beam with respect to the substrate retaining surface (see, e.g., Karner, et al., Figs. 1 and 3), the most effective, if not the only, means of contacting (or reacting) the reactive gas molecules with the substrate surface in this particular system (of Karner, et al.) is to have the gas flow from one end of the plasma beam to the other, i.e., parallel to the discharge axis. Thus, the direction of the gas flow for this type of treatment chamber is strictly a design consideration, and is not generally applicable to all PECVD systems. Furthermore, the complexity of designing a PECVD system requires consideration of a number of factors other than simply the direction of

flow, as suggested by the Examiner (see page 3, paragraph 3, of the January 4, 2006 Office Action). These factors include, but are not limited to, gas flow velocity, plasma sources, substrate size and composition, gas mixture, reactor geometry, operating conditions and intended application(s) of the system. It is, therefore, not possible for Karner, et al. to have taught or suggested to one of ordinary skill that changing a single criteria related to PECVD systems design (i.e., gas flow configuration with respect to the plasma discharge axis) in other systems with an entirely different plasma geometry and substrate orientation (such as the system described in Matsumoto, et al.) will “increase the dwell time of the gas in the plasma, and more uniformly coat the deposition configuration.” See page 3 of the January 4, 2006 Office Action.

To establish a *prima facie* case of obviousness, the initial burden is on the Examiner to show that there is suggestion or motivation in the reference for modifying or combining the teachings of the reference. See, e.g., MPEP § 2142. It is inappropriate to use applicant’s disclosure as a blueprint (or to use hindsight based on knowledge obtained from application’s patent disclosure) to reconstruct the claimed invention from selected pieces of prior art absent some suggestion, teaching, or motivation in the prior art to do so. Accordingly, Matsumoto, et al. and Karner, et al., alone or in combination, cannot render the claimed invention obvious because the references do not provide any motivation or suggestion to make the proposed modification. Karner, et al. is **completely silent** with regards to the effect of gas flow direction on the gas dwell time and surface coating.

Additionally, the Examiner does not specify the location of the reactive gas supply nozzle of the proposed system, i.e., whether the nozzle(s) will be placed on the near side

(i.e., the side closest to the substrate), the far side, or on both sides of the sheet plasma. Even presuming that the location of the reactive gas supply nozzle is not an important factor, it is expected that larger quantities of reactive gas will be needed to operate the proposed system because fewer gas molecules will pass through the high density plasma, if their flow path is parallel to the discharge plane. Modification of a reference which would render the reference unsatisfactory for its intended purpose or change the principal operation of the reference is not permitted. A reasonable expectation of success of the proposed combination or modification is also required. Therefore, Matsumoto, et al. cannot be modified in the manner proposed by the Examiner because the resulting system would have ***fewer gas molecules passing through the sheet plasma***, which is contrary to the teachings of Matsumoto, et al. See, e.g., Matsumoto, et al., col. 2, lines 43-52.

Claims 1, 2 and 4-8 are therefore believed to be patentable and in condition for allowance.

The David reference does not overcome the missing teaching of Matsumoto, et al. or Karner, et al., so that claims 3 should also now be in condition for allowance.

Thus, none of the references taken along or in combination are believed to render the claims now presented obvious. The dependent claims are believed to distinguish the invention even further from the prior art and the application and claims are believed to be in condition for allowance.

The Examiner is respectfully invited and urged to telephone the undersigned in order to reach a conclusion to the prosecution of this case, particularly in view of the finality of the last action.

Respectfully submitted,

/Chih-Sheng Lin/  
Reg. No. 56,402  
Attorney for Applicants  
(845) 359-7700

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**NOTARO & MICHALOS P.C.**  
100 Dutch Hill Road, Suite 110  
Orangeburg, New York 10962-2100

**Customer No. 21706**

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